Effects of anxiety on decision making and visual search behaviour in complex sport situations

Christian Vater
University of Bern

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Contents

Anxiety & Attentional Control

- Effects of Anxiety on Processing Efficiency and Attentional Control in Sports
  - impaired visual search behaviour in karate, table tennis, football, basketball (Williams & Elliot, 1999; Williams et al., 2002; Wilson et al., 2009a, Wilson et al., 2009b, respectively)
  - increased response times (Murray & Janelle., 2003)
  - higher mental effort (ME) in high anxiety condition (Causer et al., 2011)
  - larger pupil diameter (Wilson et al., 2006)

Apparatus and Test Film

- Apparatus:
  - Mobile eye-tracking system; HD camera; Stereo audio system
  - Analysis: ‘ASL-results plus Gaze Map’
- Test Film:
  - 11 vs. 11 football situations; 1st person view; clip duration: 5s; Occlusion: 120ms prior to certain action of player in possession of ball (i.e., pass + which player, shot, dribble)

Method

- Factors:
  - High Skilled (n=11) vs. Less Skilled (n=11)
  - Near vs. Far Task (different perceptual task demands)
  - High Anxiety (HA) vs. Low Anxiety (LA)
  - Visual Search: Fixation Location

- Anxiety Manipulations: ego threats, competitive scenario, false feedback
- Measures: visual search behaviour, response time, mental effort (RSME), state anxiety (MRF-L), response accuracy, pupil diameter
- Statistics: Repeated-measures ANOVA; partial eta squared ($p < .05$)

Results 1

- Anxiety increased in HA condition (MRF-Ratings: $F(1,20) = 13.13$, $\eta_p^2 = .40$, $p < .01$) and larger pupil diameter, $F(1,18) = 4.99$, $\eta_p^2 = .22$, $p < .05$

ACT

Response Accuracy

- No effect= *constant effectiveness*

Response Time

- significant increases in both groups, $F(1,20) = 9.29$, $\eta_p^2 = .31$, $p < .01$

= reduced processing efficiency

Mental Effort

- significant increases in both groups $F(1,20) = 13.77$, $\eta_p^2 = .41$, $p < .01$

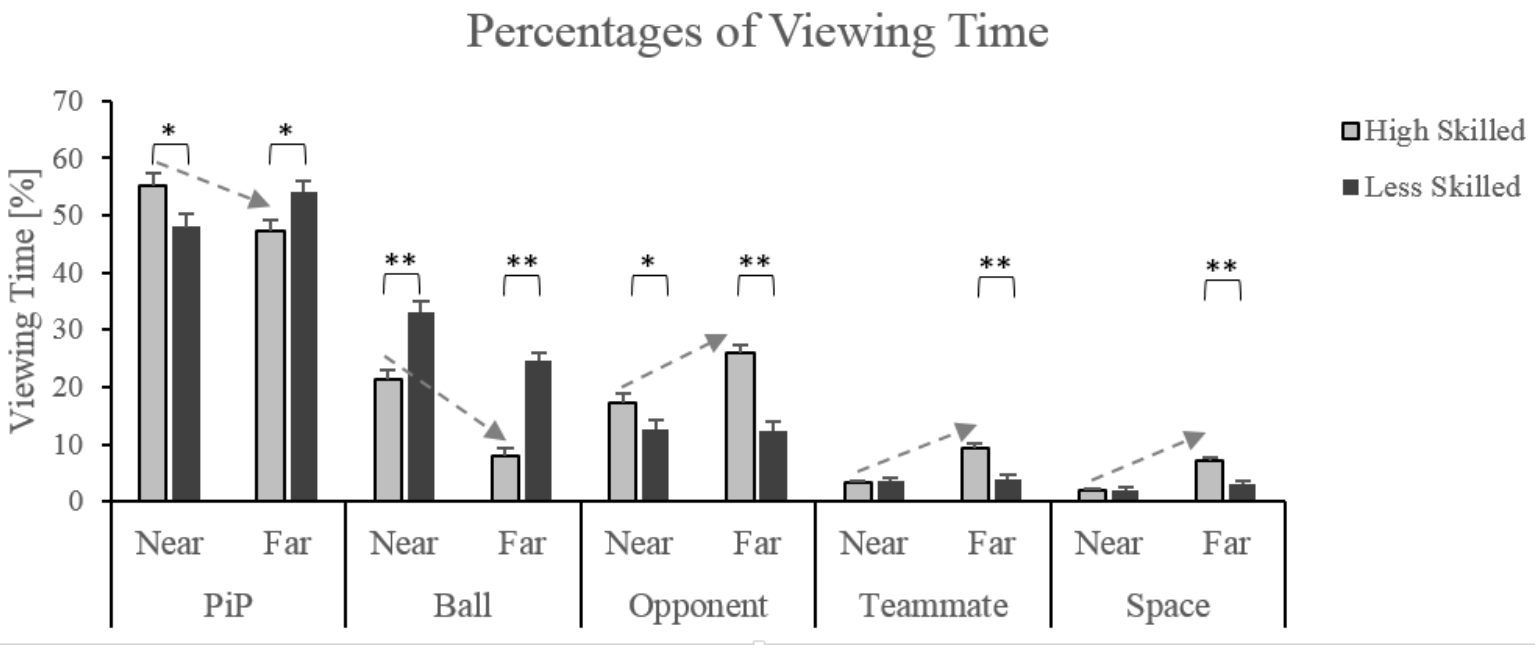
= reduced processing efficiency

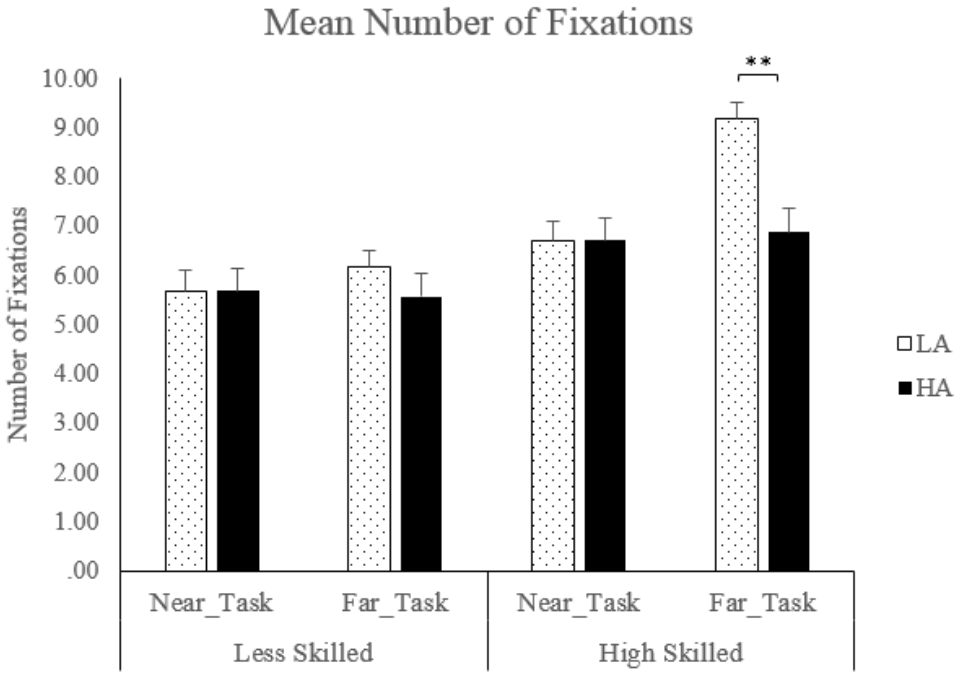
Results 2

- Visual Search Behaviour

— Effect of Expertise: fixation location X task type X group, $F(1,18) = 13.27$, $\eta_p^2 = .78$, $p < .01$

— Effect of Anxiety: anxiety X task type X group, $F(1,18) = 9.25$, $\eta_p^2 = .34$, $p < .01$





Discussion

- Reduced processing efficiency in HA condition
  - Worrying thoughts competing for attentional resources (Wilson, 2008; Wilson et al., 2009)→ reduced inhibition
  - Reduction in goal directed attention (Eysenck et al., 2007)
  - Attentional narrowing (Murray & Janelle, 2003; Williams & Elliot, 1999)
  - Reduced ability to pick up relevant optical information (Williams et al., 2002)
- Why did less skilled players didn´t show anxiety effects in Number of Fixation Locations?
  - may use the stimulus-driven attentional system to greater extend→ lower effect of anxiety (internal worrying thoughts) on visual search (from ACT perspetive)

Possible Interventions

- Perceptual-cognitive training (highlighting important areas on the pitch) → attentional control (Hagemann et al., 2006; Abernethy, 2012)
- More stress resistant learning strategies (e.g. implicit learning)→less processing of explicit rules (Beilock & Gray, 2007, Smeeton et al., 2005)
- Perceptual-control beliefs→ anxiety interpreted in facilitative manner (Wood & Wilson, 2012)

Literature

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Thank you for your attention!

Questions?